

Online Supplementary Data 2

Phylogeny and paleobiogeography of Hegetotheriidae (Mammalia, Notoungulata)

FEDERICO D. SEOANE,<sup>\*,1</sup> SERGIO ROIG JUÑENT,<sup>2</sup> AND ESPERANZA CERDEÑO<sup>3</sup>

<sup>1</sup>Universidad de Buenos Aires. CONICET. Instituto de Estudios Andinos Don Pablo Groeber (IDEAN). Facultad de Ciencias Exactas y Naturales, Ricardo Güiraldes 2160 C1428EGA Buenos Aires, Argentina. [seoane.federico@gmail.com](mailto:seoane.federico@gmail.com);

<sup>2</sup>Instituto Argentino de Investigaciones de Zonas Áridas (IADIZA), CCT-CONICET-Mendoza, Avda. Ruiz Leal s/n. 5500, Argentina. [saroig@mendoza-conicet.gob.ar](mailto:saroig@mendoza-conicet.gob.ar);

<sup>3</sup>Paleontología, Instituto Argentino de Nivología, Glaciología y Ciencias Ambientales (IANIGLA), CCT-CONICET-Mendoza, Avda. Ruiz Leal s/n. 5500 Mendoza, Argentina. [espe@mendoza-conicet.gob.ar](mailto:espe@mendoza-conicet.gob.ar)

RH: SEOANE *ET AL.*—PHYLOGENY AND PALEOBIOGEOGRAPHY OF  
HEGETOTHERIIDAE

Journal of Vertebrate Paleontology

\*Corresponding author

APPENDIX 2. Description of characters used in phylogenetic analysis. All characters are treated as unordered.

- (0) Cementum: (0) thin or absent; (1) present as thick layer.
- (1) I2/i3: (0) present; (1) absent.
- (2) C/c: (0) present; (1) absent.
- (3) P1/p1: (0) present or variably present; (1) always absent.
- (4) Relationship of canine and anterior premolars: (0) all lying directly in line with the rest of toothrow; (1) root of C lingual to P1 and p1 lingual to p2.
- (5) Relative size of I1: (0) mesio-distal length < 20% larger than that of M1; (1) mesio-distal  $\geq$  20% larger than that of M1.
- (6) Relative size of P2: (0) at least 80% length of P3; (1) less than 75% length of P3; (2) P2 absent.
- (7) Molars with single lingual groove: (0) absent; (1) present, shallow; (2) present, deep.
- (8) Angle formed by ectoloph and distal face of M1: (0) greater than 90°; (1) approximately equal to 90°; (2) less than 90°.
- (9) Relative size of M3: (0) longer than or similar in size to M2; (1) shorter than M2.
- (10) General shape of upper M3 occlusal surface: (0) triangular, pointed anteriorly; (1) triangular, pointed posteriorly; (2) rectangular or trapezoidal; (3) semicircular.
- (11) Notch on posterior face of M3: (0) absent; (1) smooth; (2) pronounced, more acute.
- (12) Relative size of i1: (0) similar in size to i2; (1) mesio-distal length > 25% larger than i2.
- (13) Flat lingual side of lower cheek teeth: (0) absent or present only at intermediate stages of wear; (1) present as salient, straight or gently convex wall.
- (14) Lower third molar shape: (0) bilobed (labial talonid groove faint or absent); (1) trilobed (labial talonid groove deep and persistent) with third lobed rounded; (2) trilobed (labial talonid groove deep and persistent) with third lobed triangular.
- (15) Size of incisive foramina: (0) restricted to premaxilla; (1) extending beyond premaxilla.
- (16) Post-incisive depressions: (0) absent; (1) present.
- (17) Postorbital processes: (0) well-pronounced, located anterior to posterior border of frontal; (1) little pronounced, located near or posterior to posterior end of frontal.
- (18) Sagittal crest: (0) present as low, narrow ridge extending from posterior orbit to occiput; (1) present as low, Y-shaped ridge bounded by deep grooves for temporalis; (2) absent.
- (19) Mastoid bulla: (0) not expanded nor easily visible in dorsal view of skull; (1) large, bulbous, expanded dorsally and medially, easily visible in dorsal view of skull.
- (20) Configuration of tibia and fibula: (0) unfused; (1) short, broad distal fusion; (2) long, narrow distal fusion.
- (21) Metapodial distal keel: (0) incomplete; (1) complete.
- (22) Posterolingual end in m1-2: (0) not projected; (1) linguallly projected.
- (23) Posterolingual groove in m3: (0) as a wide, shallow groove; (1) as an inflection point, around 90°; (2) as a narrow groove and fold; (3) hardly marked.
- (24) Occlusal features of cheek teeth: (0) well-formed fossette; (1) centered enamel band, longitudinally placed, present with advanced wear; (2) none.
- (25) I1 enamel: (0) with continuous enamel; (1) with labial enamel only; (2) with thin enamel labial and lingual, mesial-distal absent.
- (26) P3-4/p3-4: (0) not molarized; (1) little molarized; (2) molarized.
- (27) P3 shape: (0) subrectangular; (1) subtriangular; (2) ovoid.
- (28) P4 shape: (0) subrectangular; (1) subtriangular; (2) ovoid; (3) bilobed.

## APPENDIX 2. (Continued)

- (29) M1-2 shape: (0) subrectangular; (1) subtriangular; (2) ovoid; (3) bilobed; (4) trilobed.
- (30) m2 proportions: (0) between 1.60 and 2.30; (1)  $> 2.30$ ; (2)  $< 1.60$ .
- (31) Trigonid/talonid of p3: (0) subequal; (1) trigonid  $>$  talonid; (2) trigonid  $<$  talonid; (3) p3 absent.
- (32) Ratio m2/m3: (0)  $1/4$ ; (1)  $1/3$ ; (2)  $1/2$ ; (3) 1.
- (33) Diastemata: (0) absent; (1) little developed (all teeth present); (2) very developed (any absent tooth).
- (34) Metastyle on M3: (0) absent; (1) present.
- (35) Metacristid on molars: (0) present; (1) absent.
- (36) Relative size of P4: (0) at least 80% length of M1; (1) less than 80% length of M1.
- (37) Relative size of p2: (0) at least 80% length of p3; (1) less than 80% length of p3.
- (38) Posterior border of nasal; (0) straight; (1) expanded laterally and fronts with wedge shaped anteromedially; (2) expanded laterally and fronts without wedge shaped anteromedially.